Multidisciplinary Approach to Identifying Patients at Risk for VTE

A podcast educational activity

Available at
www.StopVTE.org
and at
www.ashpadvantage.com/podcasts
Multidisciplinary Approach to Identifying Patients at Risk for VTE

Activity Agenda

Highlighting One Patient’s Story: The Impact of VTE
(23 minutes)
Michael P. Gulseth, Pharm.D., BCPS

Development of a VTE Risk Assessment Model and Protocol
(21 minutes)
Jordan C. Messler, M.D., FHM

Activity Faculty

Michael P. Gulseth, Pharm. D., BCPS
Program Director for Anticoagulation Services
Sanford USD Medical Center
Sioux Falls, South Dakota

Jordan C. Messler, M.D., FHM
Medical Director
Morton Plant Hospitalists
Clearwater, Florida

Activity Description

Venous thromboembolism (deep vein thrombosis, pulmonary embolism, or both) remains a significant threat to patient safety. At least 100,000 deaths are attributable to venous thromboembolism (VTE) each year in the United States. VTE is primarily a problem of hospitalized and recently-hospitalized patients. Although the majority of medical and surgical inpatients have multiple risk factors for VTE, evidence shows that only 30% to 50% of patients receive adequate prophylaxis. Barriers to the use of prophylaxis include lack of familiarity with published clinical guidelines, underestimation of VTE risk, concern over risk of bleeding from anticoagulants, and difficulty achieving hospital-wide implementation of risk assessment procedures.

To improve inpatient safety, regulatory and professional organizations have endorsed practice guidelines for VTE prophylaxis. Current guidelines from the American College of Chest Physicians recommend that hospitals develop a formal strategy to prevent thromboembolic complications and, more specifically, provide prophylaxis in patients with VTE risk factors.

This activity will outline a multidisciplinary team approach to the implementation of effective VTE risk assessment and prevention strategies in hospitalized patients. Physician leadership of the multidisciplinary team is essential to integrate VTE risk assessment processes into routine patient care practices. A case study will be used to illustrate important concepts as well as provide active learning for participants.
Learning Objectives

After participating in this knowledge-based educational activity, participants should be able to:

- Describe the incidence, clinical consequences, and impact on health resource utilization of VTE.
- Identify and explain important risk factors for VTE in hospitalized patients.
- Characterize a multidisciplinary risk-assessment strategy for the prevention of VTE in hospitalized patients.
- Develop and implement a multidisciplinary VTE prevention protocol.

Continuing Education Information

This activity was recorded on May 4, 2010. Continuing education credit for this podcast is available through November 30, 2011, for pharmacists, physicians, nurses, nurse practitioners, and case managers. To be eligible for continuing education credit, you must complete the post-test and post-activity evaluation online at the ASHP Learning Center at http://ce.ashp.org.

Accreditation for Pharmacists
The American Society of Health-System Pharmacists is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education. This activity provides 1 hour (0.1 CEU) of continuing pharmacy education credit (ACPE Activity #204-000-10-430-H01P).

Accreditation for Physicians
The American Society of Health-System Pharmacists is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

The American Society of Health-System Pharmacists designates this educational activity for a maximum of 1 AMA PRA Category 1 Credit(s)™. Physicians should only claim credit commensurate with the extent of their participation in the activity. (Activity number 10734)

Accreditation for Nurses
Educational Review Systems is an approved provider of continuing nursing education by the Alabama State Nurses Association, an accredited approver by the American Nurses Credentialing Center’s Commission on Accreditation (provider # 5-115). This activity provides 1 hour of continuing nursing education.

Educational Review Systems is also approved for nursing continuing education by the state of California, the state of Florida, and the District of Columbia.
Multidisciplinary Approach to Identifying Patients at Risk for VTE

Accreditation for Nurse Practitioners
This program is approved for 1.0 contact hours of continuing education by the American Academy of Nurse Practitioners. Program ID 1005164. This program was planned in accordance with AANP CE Standards and Policies and AANP Commercial Support Standards.

Accreditation for Case Managers
This activity has been approved by the Commission for Case Manager Certification (CCMC) for 1 CEU. Sponsor code: CM2503. Approval number: CM2503-A201.

Methods and Format
This continuing education activity is available in two formats:

- **Web-Based.** An online activity consisting of audio and slide presentations, a post-test, and a post-activity evaluation tool.
- **Podcast.** An audio-only version of the presentations that can be downloaded to your computer or portable MP3 player, slides (included in optional PDF handout), a post-test, and a post-activity evaluation tool.

Participants must view or listen to all presentations, take the activity post-test, and complete the post-activity course evaluation to receive continuing education credit. A minimum score of 70% is required on the post-test for credit to be awarded. Participants may print their official statement of continuing education credit immediately after successful completion of the post-test and post-activity evaluation. The estimated time to complete this activity is 1 hour. This activity is provided free of charge.

Target Audience
This continuing education activity was planned to meet the needs of physicians, including hospitalists, internists, and orthopedic surgeons, pharmacists, nurses, nurse practitioners, and case managers; those who will benefit include all health care providers who are interested in preventing VTE in health systems using a multidisciplinary approach. This activity will be particularly beneficial to practitioners with an interest in a multidisciplinary team approach to implementing effective VTE risk assessment and prevention strategies.

Participants are encouraged to complete the online activities in the educational initiative Quality Improvement in Managing Patients at Risk for Venous Thromboembolism: Interventional Strategies before participating in other offerings. Select the modules that best meet your educational needs, then expand your expertise during live or archived activities, such as webinars and workshops. Go to www.StopVTE.org to find complete information.
Instructions for Receiving Your CE Statement Online

The online ASHP Learning Center allows participants to obtain their CE statements conveniently and immediately using any computer with an Internet connection. To take the post-test and obtain your CE statement for this ASHP Advantage Podcast activity, please follow these steps:

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3. After creating your account, log in to the ASHP Learning Center using your e-mail address and password to take the post test for this activity.

4. Click on the radio button next to the correct answer for each question. When you are satisfied with your selections, click “Grade Test” to process your test.

5. Complete the activity evaluation and print your CE statement.

NEED HELP? Contact ASHP Advantage at support@ashpadvantage.com
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The faculty and planners report the following relationships:

Michael P. Gulseth, Pharm. D., BCPS
Dr. Gulseth declares that he has served on the speaker’s bureau for Eisai, GlaxoSmithKline, and sanofi-aventis, and is a consultant for Ortho-McNeil-Janssen and sanofi-aventis.

Jordan C. Messler, M.D., FHM
Dr. Messler declares that he has no relationships pertinent to this activity.

Cathy Bowles, B.S. Pharm.
Ms. Bowles declares that she has no relationships pertinent to this activity.

Susan R. Dombrowski, M.S., B.S. Pharm.
Ms. Dombrowski declares that she has no relationships pertinent to this activity.
Multidisciplinary Approach to Identifying Patients at Risk for VTE

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Department of Pharmaceutical Services
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Michael P. Gulseth, Pharm.D., BCPS, is Program Director for Anticoagulation Services at Sanford University of South Dakota Medical Center, Department of Pharmaceutical Services in Sioux Falls, South Dakota. Dr. Gulseth received his Doctor of Pharmacy degree in 1999 from North Dakota State University in Fargo, North Dakota. He completed residency training at United Hospital in St. Paul, Minnesota. He is lead author and editor of Managing Anticoagulation Patients in the Hospital: The Inpatient Anticoagulation Service, published in 2007 by the American Society of Health-System Pharmacists.

Dr. Gulseth is a member of the Editorial Advisory Board of the American Journal of Health-System Pharmacy. He is an active member of several professional pharmacy organizations, including the American Society of Health-System Pharmacists, the Minnesota Society of Health-System Pharmacists (past president), the South Dakota Society of Health-System Pharmacists, and the American College of Clinical Pharmacy. His research interests include evaluation of antithrombotic therapies in the inpatient setting and evaluation of the benefits of pharmacist-managed inpatient anticoagulation services.
Multidisciplinary Approach to Identifying Patients at Risk for VTE

Jordan C. Messler, M.D., FHM
Medical Director
Morton Plant Hospitalists
Clearwater, Florida

Jordan C. Messler, M.D., FHM, is Medical Director, Morton Plant Hospitalists, Morton Plant Hospital in Clearwater, Florida. He earned his Doctor of Medicine degree at the University of South Florida College of Medicine in Tampa, Florida, and completed a residency in internal medicine at Emory University in Atlanta, Georgia.

Upon completion of his residency training, Dr. Messler served as faculty at Emory University, working as a hospitalist in one of the first academic center hospitalist groups. In 2005, Dr. Messler relocated to serve as the director of an active community hospitalist group at Morton Plant Hospital in Clearwater, Florida. He is a member of the 2009 inaugural class of Fellows in Hospital Medicine.

Dr. Messler is active in several quality improvement projects, leading hospital-wide efforts to improve prevention and management of venous thromboembolism (VTE), inpatient management of diabetes, and transitions of care. He participates in the following national initiatives coordinated by the Society of Hospital Medicine (SHM); including VTE prevention, project BOOST, designed to improve transitions in patient care, and a national initiative to improve glycemic control in patients with diabetes. In April 2010, Dr. Messler joined SHM’s Hospital Quality and Patient Safety Committee.
Highlighting One Patient’s Story: The Impact of VTE
Michael P. Gulseth, Pharm.D., BCPS
Sioux Falls, South Dakota

Learning Objectives
• Describe the incidence, clinical consequences, and impact on health resource utilization of VTE.
• Identify and explain important risk factors for VTE in hospitalized patients.
• Characterize a multidisciplinary risk-assessment strategy for the prevention of VTE in hospitalized patients.
• Develop and implement a multidisciplinary VTE prevention protocol.

VTE Chronicles
Follow the Story of Mr. J. H. Patient

CHIEF COMPLAINT & HPI
• JHP is an 82-year-old gentleman who presents to ED
• Complains of worsening SOB on exertion and dyspnea at rest
• Denies chest pain, orthopnea, or PND
• Reports leg swelling and a 20-lb weight gain over last 2 weeks
• Feels lightheaded and weak

PAST MEDICAL HISTORY
• Hypertension, obesity
• Dyslipidemia, type 2 diabetes
• Coronary artery disease status post CABG. Estimated ejection fraction 35% 1 month ago
• Cardiomyopathy
• History of heart failure and fluid retention
• Neurophathy
• History of CVA
• Biventricular ICD, Pacemaker
• Total knee replacement

ICD = implantable cardioverter defibrillator

PERTINENT LAB VALUES
• WBC = 3.7 x10⁹ cells/L
• Hgb 11.7 g/dL
• Platelets 114,000/µL
• SCr 1.39 mg/dL
• Potassium 4.5 mEq/L
• Blood glucose 184 mg/dL

MEDICATIONS
• Lisinopril 40 mg daily
• Enteric-coated aspirin 81 mg daily
• Senna daily
• Digoxin 0.125 mg daily
• Simvastatin 80 mg b.i.d
• Spironolactone 25 mg daily
• Metoprolol-ER 50 mg daily
• Terasoln 5 mg daily
• Furosemide 80 mg daily
• He was supposed to start metolazone 2.5 mg 3 times a week

Prevention of Hospital-acquired VTE
• Requires a multidisciplinary team approach.
• Knowledge VTE complications is essential.
• Can everyone on your patient care team perform an effective VTE risk assessment?
• Test your knowledge of VTE.

Which of the following is NOT a possible complication of VTE?
• Death
• Pulmonary hypertension
• Acute renal failure
• Post-thrombotic syndrome
• Increased risk of future VTE

Please select one response.
Deep Vein Thrombosis (DVT)

Pathophysiology

Key Points

- Thrombi form in venous valve pockets and other areas of stasis
- Clots can dislodge and travel through venous vasculature and heart to the lungs
- Increased risk for embolism of clots that originate or propagate above the knee


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DVT/PE: Annual Incidence in U.S.

- Death
- Pulmonary Hypertension
- Pulmonary Embolism
- Post-Thrombotic Syndrome
- Symptomatic DVT
- Asymptomatic DVT

Survival % After VTE

<table>
<thead>
<tr>
<th>Time</th>
<th>DVT Alone*</th>
<th>PE ± DVT</th>
<th>All VTE*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>0 days</td>
<td>97.0</td>
<td>63.6</td>
<td>76.5</td>
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<tr>
<td>14 days</td>
<td>95.7</td>
<td>57.1</td>
<td>68.7</td>
</tr>
<tr>
<td>30 days</td>
<td>94.5</td>
<td>55.6</td>
<td>66.8</td>
</tr>
<tr>
<td>90 days</td>
<td>91.9</td>
<td>52.1</td>
<td>62.8</td>
</tr>
<tr>
<td>1 yr</td>
<td>85.4</td>
<td>47.7</td>
<td>57.4</td>
</tr>
<tr>
<td>2 yr</td>
<td>81.4</td>
<td>44.6</td>
<td>53.6</td>
</tr>
<tr>
<td>5 yr</td>
<td>72.6</td>
<td>39.4</td>
<td>47.4</td>
</tr>
<tr>
<td>8 yr</td>
<td>65.2</td>
<td>34.5</td>
<td>41.5</td>
</tr>
</tbody>
</table>

VTE Recurrence

<table>
<thead>
<tr>
<th>Time to Recurrence</th>
<th># at Risk</th>
<th>Cumulative Recurrence Hazard of Recurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days</td>
<td>1720</td>
<td>0.0%</td>
</tr>
<tr>
<td>30 days</td>
<td>1502</td>
<td>5.2%</td>
</tr>
<tr>
<td>90 days</td>
<td>1389</td>
<td>8.3%</td>
</tr>
<tr>
<td>180 days</td>
<td>1292</td>
<td>10.1%</td>
</tr>
<tr>
<td>1 year</td>
<td>1171</td>
<td>12.9%</td>
</tr>
<tr>
<td>2 years</td>
<td>1002</td>
<td>16.6%</td>
</tr>
<tr>
<td>5 years</td>
<td>723</td>
<td>22.8%</td>
</tr>
<tr>
<td>10 years</td>
<td>418</td>
<td>30.4%</td>
</tr>
</tbody>
</table>


Post-thrombotic Syndrome (PTS)

- Occurs in 20-50% of patients after documented episode of DVT
- Characterized by chronic swelling, pain, and ulceration
- In a clinical trial, up to 23% of DVT sufferers developed PTS within 2 years
  - Estimated annual per-patient cost of severe PTS as complication of DVT $3817 in first year and $1677 in subsequent years
  - Mean annualized total health care costs increased by 32% ($11,667) in patients who develop PTS after a DVT episode compared with those who do not develop PTS

Long-Term Complications of DVT


<table>
<thead>
<tr>
<th>Cumulative Incidence</th>
<th>Survival rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent DVT</td>
<td>2 years 17%</td>
</tr>
<tr>
<td></td>
<td>5 years 24%</td>
</tr>
<tr>
<td></td>
<td>8 years 30%</td>
</tr>
<tr>
<td>Post-thrombotic</td>
<td>syndrome</td>
</tr>
</tbody>
</table>

Patients At Risk for VTE and Receiving Recommended Prophylaxis: ENDORSE


ACCP = American College of Chest Physicians

Potential Reasons for Limited Compliance With Guidelines

• PHYSICIAN-RELATED
  – Thrombosis not perceived as a problem
  – Perceived lack of efficacy of thromboprophylaxis
  – Concerns about bleeding risks
  – Risk assessment difficulties
  – Lack of awareness of guidelines


Preventable Nature of VTE: Missed Opportunity

• Failure to provide VTE prophylaxis
• Reasons for noncompliance with practice guidelines for VTE prophylaxis


Potential Reasons for Limited Compliance With Guidelines

• GUIDELINE-RELATED
  – Difficult/inconvenient/cumbersome to use
  – Confusing
  – Greater difficulty changing established behavior than adopting new behavior
  – “Trialability” of guidelines


Potential Reasons for Limited Compliance With Guidelines

• ENVIRONMENT-RELATED
  – Time limitations
  – Lack of staff and resources
  – Concerns about cost and reimbursement
  – Liability concerns


Patients at Risk for VTE and Receiving Recommended Prophylaxis: ENDORSE

Primary objectives

Overall (N= 68,183)

Secondary objectives

Surgical (n = 30,827)

Medical (n = 27,356)

52% at Risk for VTE

50% receiving ACCP Recommended Prophylaxis

64% at Risk for VTE

59% receiving ACCP Recommended Prophylaxis

42% at Risk for VTE

40% receiving ACCP Recommended Prophylaxis

N = 528 patients with symptomatic DVT followed long term after 3 months of appropriate therapy (Low Molecular Weight Heparin or oral anticoagulation)

ACCP = American College of Chest Physicians

Preventable Nature of VTE: Missed Opportunity
Appropriate Management of VTE:
Why Is It So Important?
- VTE is a national health care issue due to patient morbidity/mortality and the economic burden.
- The cost of treating DVT each year is up to $1.5 billion in the U.S.

Virchow’s Triad
- Advancing age
- Immobilization
- Stroke
- Anesthesia
- Heart or lung failure
- Hyperviscosity

Risk of DVT Without Thromboprophylaxis in Hospitalized Patients

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>DVT Prevalence %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical patients</td>
<td>10 – 20</td>
</tr>
<tr>
<td>General surgery</td>
<td>15 – 40</td>
</tr>
<tr>
<td>Major gynecologic surgery</td>
<td>15 – 40</td>
</tr>
<tr>
<td>Major urologic surgery</td>
<td>15 – 40</td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>15 – 40</td>
</tr>
<tr>
<td>Stroke</td>
<td>20 – 50</td>
</tr>
<tr>
<td>Hip or knee arthroplasty or Hip Fracture Surgery</td>
<td>40 – 60</td>
</tr>
<tr>
<td>Major trauma</td>
<td>40 – 80</td>
</tr>
<tr>
<td>Spinal cord injury</td>
<td>60 – 80</td>
</tr>
<tr>
<td>Critical care patients</td>
<td>10 – 80</td>
</tr>
</tbody>
</table>

When and Who Will Perform and Document a VTE Risk Assessment for JHP?

CHIEF COMPLAINT & HPI
- JHP is an 82-year-old gentleman who presents to ED
- Complains of worsening SOB on exertion and dyspnea at rest
- Denies chest pain, orthopnea, or PND
- Reports leg swelling and a 20-lb weight gain over last 2 weeks
- Feels lightheaded and weak

PAST MEDICAL HISTORY
- Hypertension, obesity
- Dyslipidemia, type 2 diabetes
- Coronary artery disease status post CABG. Estimated ejection fraction 35% 1 month ago
- Cardiomyopathy
- History of heart failure and fluid retention
- Neuropathy
- History of CVA
- Biventricular ICD, Pacemaker
- Total knee replacement

JHP presents with an acute exacerbation of heart failure. Which of the following is NOT a VTE risk factor?
- Neuropathy
- Advanced Age
- Acute medical illness/acute heart failure
- Obesity

VTE in the Outpatient Setting

67% of events occurring within 3 months after hospitalization occurred within the first month after discharge
- Median LOS = 4 days
- Mean LOS = 7.4 days

-0-24 days
-30-59 days
-60-90 days

-0-24 days
-30-59 days
-60-90 days

Impact of VTE Summary

- VTE continues to be a major cause of morbidity and mortality in the United States.
  - Has led to efforts to improve VTE prophylaxis
- The best way to treat VTE is to prevent it from occurring.
- The best prevention efforts involve your health care team working together to prevent VTE.

Learning Objectives

- Describe the incidence, clinical consequences, and impact on health resource utilization of VTE.
- Identify and explain important risk factors for VTE in hospitalized patients.
- Characterize a multidisciplinary risk-assessment strategy for the prevention of VTE in hospitalized patients.
- Develop and implement a multidisciplinary VTE prevention protocol.

Hierarchy of Reliability

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>Predicted Prophylaxis Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No Protocol- “state of nature”</td>
</tr>
<tr>
<td>2</td>
<td>Decision Support Exists Doesn't link to order writing OR Prompts within orders but no decision support</td>
</tr>
<tr>
<td>3</td>
<td>Protocol Well Integrated</td>
</tr>
<tr>
<td>4</td>
<td>Protocol Enhanced</td>
</tr>
<tr>
<td>5</td>
<td>Oversights identified and addressed in real time</td>
</tr>
</tbody>
</table>


What Percentage of Medical Patients in U.S. Hospitals Receive VTE Prophylaxis Consistent with ACCP Guidelines?

- 30%
- 50%
- 70%
- 90%

Please select one response.

Development of a VTE Risk Assessment Model and Protocol

Jordan Messler, M.D., FHM
Clearwater, Florida

Duration of Risk: VTE Occurs Weeks After Surgery

Thromboembolic Events

<table>
<thead>
<tr>
<th>Weeks</th>
<th>% Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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</tr>
<tr>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>3</td>
<td>1.5</td>
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<td>4</td>
<td>2.0</td>
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<tr>
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<td>2.5</td>
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<tr>
<td>12</td>
<td>6.0</td>
</tr>
<tr>
<td>13</td>
<td>6.5</td>
</tr>
</tbody>
</table>

Primary hip

Pulmonary Embolism

<table>
<thead>
<tr>
<th>Weeks</th>
<th>% Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>3</td>
<td>1.5</td>
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<td>12</td>
<td>6.0</td>
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<tr>
<td>13</td>
<td>6.5</td>
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</tbody>
</table>

Primary knee

**60% RELIABLE**


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**Adherence to Asthma Guidelines 70% Reliable**


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**Appropriate Use of Basal Insulin in Hospitalized patients 40% Reliable**


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**VTE Prophylaxis 30-60% Reliable**


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**JHP’s Hospitalization**

- JHP presented with an acute exacerbation of heart failure. He is admitted for diuresis with intravenous furosemide.
- His nurse on 6East notes that VTE prophylaxis orders were not placed in his chart.
- She obtains the hospital’s VTE risk assessment form.
- It’s a new form that includes a list of various risk factors. She has not received instructions for completing the new form.
- She asks JHP’s attending physician to complete the risk assessment form.
- What happens next at your institution?

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**JHP’s Team Decides to Discuss VTE Prevention at Staff Meeting**

The nurse asks
- Why aren’t we providing a VTE risk assessment for all patients and appropriate prophylaxis at the time of admission?
- How do I get the physician to complete the risk assessment form?
- Is this the best risk assessment tool?
**Barriers Do Exist**

- Knowledge gaps
- False beliefs
- Unfamiliar with guidelines
- Guidelines not always in agreement for certain patient groups
- Concerns about adverse effects


**Steps for Success**

- Order set development
- Balance guidance/efficiency
- Multidisciplinary approach
- Add reliable strategies

**How to Create an Order Set and Protocol that Works**

- Establish a risk assessment model
- Link with prophylaxis orders
- Clarify contraindications
- Successful order set and protocol will be
  - Simple
  - Easy to use
  - Reproducible
  - Reliable

**Next Steps**

- What do ACCP guidelines say about VTE prophylaxis?
- What validated risk scoring systems currently are available?
- What alert systems have been studied?
- What other strategies for improvement of VTE protocols are available?

**ACCP 2008 Strategies**

<table>
<thead>
<tr>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every hospital should develop a formal, written, institution-wide VTE prophylaxis policy</td>
</tr>
<tr>
<td>Use strategies designed to increase prophylaxis adherence</td>
</tr>
<tr>
<td>Computer decision support systems</td>
</tr>
<tr>
<td>Pre Printed Order Sets</td>
</tr>
<tr>
<td>Audit and Feedback</td>
</tr>
<tr>
<td>Passive methods shouldn’t be sole strategy</td>
</tr>
</tbody>
</table>

Which of the Following Risk Assessment Models is Used at Your Institution?

• Every patient receives prophylaxis upon admission: Default systems
• Risk Scoring, assigning points
• Risk Recognition System
• No risk assessment model in place

Please select one response.

Various Risk Scoring Systems

• Prophylaxis Default Systems: No Math
• Risk Scoring with Weighted Risk Factors: Assign Points
• Risk Recognition Systems: No Math

Too Little Guidance
Prompt ≠ Protocol

DVT PROPHYLAXIS ORDERS

☐ Sequential compression devices
☐ Unfractionated heparin
☐ LMWH
☐ No prophylaxis, ambulate

Validated Risk Scoring Systems

University of Michigan Health System
• Evaluated Caprini Risk Assessment model
• Surgical patients
• Point scoring system
• Predicts risk


Validated Risk Scoring Systems

University of California San Diego
• Retrospective analysis
• Three-tier risk assessment model (RAM)
• Predicts Risk
• Validated in actual use

Critiques of VTE Risk Assessment Model Using Point Scoring Techniques

- Low interobserver agreement in real use
- Users stop adding up points
- Too large to be modular
- Point scoring is arbitrary

Low
- Ambulatory patient without VTE risk factors
- Observation patient with LOS ≤ 2 days
- Same day surgery or minor surgery

Moderate
- All others
- Most medical/surgical patients
- Lower extremity arthroplasty
- Hip, pelvic, or severe lower extremity fracture
- Abdominal or pelvic cancer surgery
- Multiple major trauma

High
- Lower extremity arthroplasty
- Hip, pelvic, or severe lower extremity fracture
- Abdominal or pelvic cancer surgery
- Multiple major trauma


How to Create an Order Set and Protocol that Work

- Establish a risk assessment model
- Link with prophylaxis orders
- Clarify contraindications
- Successful order set and protocol will be
  - Simple
  - Easy to Use
  - Reproducible
  - Reliable


JHP’s Hospitalization Continues

- JHP’s physician completed the risk assessment form. Mechanical VTE prophylaxis was ordered.
- JHP improved after diuresis (weight loss of 2 kg).
- JHP was instructed to ambulate 3X/day. His legs are improving but still swollen and painful, so he stays in bed most of the day.
- Sequential compression device (SCD) arrives from supply room.

Low
- Ambulatory patient without VTE risk factors
- Observation patient with LOS ≤ 2 days
- Same day surgery or minor surgery

Moderate
- All others
- Most medical/surgical patients

High
- Lower extremity arthroplasty
- Hip, pelvic, or severe lower extremity fracture
- Abdominal or pelvic cancer surgery
- Multiple major trauma

Early Ambulation

Order Set Development
Other Options

• “Opt out” strategy
• Nurse-initiated or pharmacy-driven risk assessment
• Different order sets for different specialties

Order Set Development
CHALLENGES

• Should be easy to use: “automatic”
• Trade-off between guidance and efficiency
• Make sure it captures almost all patients
  — Admissions
  — Transfers
  — Postoperative patients

FORM=FUNCTION

• Prompt ≠ Protocol
• No protocol = No guidance at the point of care
• Implementation / Reliability
  — At 15 months, only about half of inpatient admissions utilized standardized order set

Other methods needed to enhance performance!

Which of the Following Strategies is Most Important for Providing Appropriate VTE Prophylaxis for JHP?

• Multidisciplinary team with a systems approach to VTE prevention
• VTE prophylaxis order set in all charts
• Electronic reminder to use VTE prophylaxis
• Staff education about VTE prophylaxis
• Real time identification of whether JHP is receiving prophylaxis

Please select one response.
Optimize Strategies for Effective VTE Prevention

- Alert Systems
  - Electronic alerts (E-alerts)
  - Human alerts
- Computerized decision support
- Raising situational awareness
- Audit and feedback

Next Steps

- What do ACCP guidelines say about VTE prophylaxis?
- What validated risk scoring systems currently are available?
- What alert systems have been studied?
- What other strategies for improvement of VTE protocols are available?

E-Alerts

- 2506 hospitalized patients
- VTE risk score ≥ 4
- Randomized to intervention (E-alert) or control

Bottom Line - Alerts

- Useful strategy
- E-alerts and human alerts can work
- Be aware of alert fatigue
- Need a multifaceted approach
Quality Improvement Strategy
Specific Ideas for VTE Prevention

- Provider education
- Provider reminder systems
- Facilitated relay of clinical data to providers
- Audit and feedback of performance to providers
- Patient education
- Organizational or operational change
- Incentives, regulation, and policy
- Health system directed


Strategies to Improve Prophylaxis Rates

- Setting: Community Teaching Hospital
  - INTERVENTION
    - In-services
    - Newsletters
    - Quality improvement presentations


Strategies to Improve Prophylaxis Rates

- Setting: Tertiary Care Center
  - INTERVENTION
    - On admission: VTE risk assessment scheme
    - On admission: order set with optimal VTE prevention regimen
    - Education sessions


Hierarchy of Reliability

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>Predicted Prophylaxis RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No Protocol- &quot;state of nature&quot;</td>
</tr>
<tr>
<td>2</td>
<td>Decision Support Exists Doesn’t link to order writing OR Prompts within orders but no decision support</td>
</tr>
<tr>
<td>3</td>
<td>Protocol Well Integrated</td>
</tr>
<tr>
<td>4</td>
<td>Protocol Enhanced</td>
</tr>
<tr>
<td>5</td>
<td>Oversights identified and addressed in real time</td>
</tr>
</tbody>
</table>


JHP’s Team Reviews VTE Prevention at Staff Meeting

The nurse discusses with the physician why SCDs were ordered and not pharmacologic prophylaxis.
Most Common Mistakes in VTE Prevention Orders

- Poor balance of guidance and efficiency
  - Too little guidance - prompt ≠ protocol
  - Too much guidance - collects dust, too lengthy
- Too much reliance on mechanical measures
- Point-based risk assessment model
- Failure to revise old order sets
- Too many categories of risk
- Failure to pilot test, revise, monitor
- Link between risk level and prophylactic choices separated by time or space

REVIEW: Team Action Plan for VTE Prevention

- Develop Order Set
  - Risk Scoring: Math vs. no math
  - Physician vs. nursing implementation
  - Consider pairing risk scoring with prophylaxis
  - Keep it simple, reproducible, reliable
- Implement High Reliability QI Strategies
  - Beware alert fatigue
  - Alerts, real time identification

Implement an Effective VTE Prevention Strategy using a Multidisciplinary Approach

- VTE risk assessment for every patient on admission and throughout hospitalization
- Select appropriate VTE agents
- Handoffs
  - ADDITIONAL
    - Institution support
    - Survey prior and ongoing efforts
    - Stakeholders
    - Assemble effective team
    - Set goals and timeline
    - Structured framework for improvement
    - Real time feedback

Multidisciplinary Approach to Identifying Patients at Risk for VTE

References and Resources


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